

IN THE CLAIMS

Please cancel without prejudice Claims 1-64.

Please add new Claims 65-101 as follows:

--65. A remote power meter monitoring system, comprising:
a multiplicity of radio frequency transmit-only devices
configured to transmit information, each radio frequency transmit-
only device comprising,

a timer comprising a memory that holds a pseudo
random time interval value, said timer configured to autonomously
initiate transmission of said information after expiration of a
time duration corresponding to said pseudo random time interval
value held in said memory,

a pseudo-randomization means for generating and
loading said pseudo random time interval value into said timer,
and

a retransmission means for redundantly transmitting
said information a predetermined number of times;

at least one sensing element configured to provide sensor
data to said radio frequency transmit-only device, said
transmitted information comprising said sensor data, an
identification address being assigned to said radio frequency
transmit-only device to which the sensor data is provided, and
error detection code bits;

at least two receivers each configured to receive said
transmitted information, and configured to validate said
information based on said identification address and said error
detection code bits contained in said transmitted information,
said receivers providing redundant reception of said transmitted

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information; and

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a monitoring means for monitoring said information as received and validated by at least one of said receivers.

66. A remote power meter monitoring system, comprising:

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a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, each radio frequency transmit-only device comprising,

a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a timer configured to hold a pseudo random time interval value, said timer configured to initiate transmission of said information after expiration of a time duration corresponding to said pseudo random time interval value,

a pseudo-randomization means for generating and loading said pseudo random time interval value into said timer,

a retransmission means for redundantly transmitting said information a predetermined number of times, and

a wake-up circuit configured to initiate said crystal oscillator and said processor in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said processor in a reduced current state between transmissions;

at least one sensing element configured to provide sensor

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data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

at least two receivers each configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receivers providing redundant reception of said transmitted information; and

a monitoring means for monitoring said information as received and validated by at least one of said receivers.

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67. A remote power meter monitoring system, comprising:

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a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, said information comprising a first field comprising a preamble configured to establish chip code timing synchronization and a second field comprising data, said first field being transmitted prior to said second field, said preamble having a length measured in bit times that is at least equal in length to a number of chips in a chip code sequence used to produce said spread spectrum signal, each radio frequency transmit-only device comprising,

a timer comprising a memory for holding a pseudo random time interval value, said timer configured to autonomously

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initiate transmission of said information after expiration of a time duration corresponding to said pseudo random time interval value held in said memory,

a pseudo-randomization means for generating and loading said pseudo random time interval value into said timer, and

a retransmission means for redundantly transmitting said information a predetermined number of times;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

at least two receivers each ^{configurable} ~~configured~~ to receive said transmitted information, and ^{configurable} ~~configured~~ to validate said information based on said identification address and said error detection code bits contained in said transmitted information; said at least two receivers providing redundant reception of said transmitted information, said at least two receivers configured to establish chip code synchronization to said direct sequence spread spectrum signal using said preamble; and

a monitoring means for monitoring said information as received and validated by at least one of said receivers.

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~~68~~. A remote power meter monitoring system, comprising:
a multiplicity of radio frequency transmit-only devices

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said information a predetermined number of times;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

at least two receivers each ^{Configurable} configured to receive said transmitted information, and ^{Configurable} configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receivers providing redundant reception of said transmitted information, said receivers comprising respective parallel correlation means for establishing chip code synchronization using said preamble; and

a monitoring means for monitoring said information as received and validated by at least one of said receivers.

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~~70~~. A remote power meter monitoring system, comprising:

a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, each radio frequency transmit-only device comprising,

a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a timer configured to delay transmission of said information by a predetermined delay after said expiration of ^asaid time duration so as to allow for crystal stabilization, transmit carrier frequency stabilization and chip code timing generation stabilization,

a retransmission means for redundantly transmitting said information a predetermined number of times, and

a wake-up circuit configured to initiate said crystal oscillator and said processor in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said processor in a reduced current state between transmissions;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

at least two receivers each of which being configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receivers providing redundant reception of said transmitted information; and

a monitoring means for monitoring said information as received and validated by at least one of said receivers.

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B ⁷ 71. The system according to Claims ¹ ~~66~~, ³ ~~67~~, ⁴ ~~68~~, or ⁵ ~~69~~,
wherein respective of said radio frequency transmit-only devices,
further comprises:

a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

an oscillator configured to generate a carrier on which said information to be transmitted is modulated;

a wake-up circuit configured to initiate said crystal oscillator and said oscillator in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said oscillator in a reduced current state between transmissions, said information being transmitted after a predetermined delay with respect to when said crystal oscillator and said oscillator are placed in said respective active states so as to allow for stabilization in said oscillator and said crystal oscillator prior to information transmission.

Sub B3 72. The system according to Claims 67, 68, 69, or 70,
wherein a chip code sequence used to produce said preamble is a same sequence as a data bearing chip code sequence.

⁹ 73. A remote power meter monitoring system, comprising:
a multiplicity of radio frequency transmit-only devices
~~configured to transmit information~~ ^{in a message} each radio frequency transmit-

only device comprising,

a timer configured to autonomously initiate transmission of said information after expiration of a time duration, and

B a pseudo-randomization means for randomizing the time ^{duration} ~~interval~~ between transmissions of said message,

a retransmission means for redundantly transmitting said message a predetermined number of times,

Q2 Cont a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a carrier generator mechanism configured to generate a carrier on which said information to be transmitted is modulated, and

00059378 050097 a wake-up circuit configured to initiate said crystal oscillator and said carrier generator mechanism in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said carrier generator mechanism in a reduced current state between transmissions, said information being transmitted after a predetermined delay with respect to when said crystal oscillator and said carrier generator mechanism are placed in said respective active states so as to allow for stabilization in said carrier generator mechanism and said crystal oscillator prior to information transmission;

at least one sensing element configured to provide sensor

data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

a receiver configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information; and

a monitoring means for monitoring said information as received and validated by said receiver.

74. A remote power meter monitoring system, comprising:

a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, each radio frequency transmit-only device comprising,

a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a timer configured to initiate transmission of said information after expiration of a time duration,

a retransmission means for redundantly transmitting said information a predetermined number of times,

a pseudo-randomization means for randomizing the time interval between redundant transmissions,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a wake-up circuit configured to initiate said crystal oscillator and said carrier generator mechanism in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said carrier generator mechanism in a reduced current state between transmissions, said information being transmitted after a predetermined delay with respect to when said crystal oscillator and said carrier generator mechanism are placed in said respective active states so as to allow for stabilization in said carrier generator mechanism and said crystal oscillator prior to information transmission;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

a receiver configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits

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a carrier generator mechanism configured to generate

a carrier on which said information to be transmitted is modulated, and

a wake-up circuit configured to initiate said crystal oscillator and said carrier generator mechanism in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said carrier generator mechanism in a reduced current state between transmissions, said information being transmitted after a predetermined delay with respect to when said crystal oscillator and said carrier generator mechanism are placed in said respective active states so as to allow for stabilization in said carrier generator mechanism and said crystal oscillator prior to information transmission;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

a receiver configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receiver configured to establish chip code synchronization to said direct sequence spread spectrum signal using said preamble; and

a monitoring means for monitoring said information as received and validated by said receiver.

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A remote power meter monitoring system, comprising:

a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, said information comprising a first field comprising a preamble configured to establish chip code timing synchronization and a second field comprising data, said first field being transmitted prior to said second field, said preamble having a length measured in bit times that is at least equal in length to a number of chips in a chip code sequence plus approximately five bit times, each radio frequency transmit-only device comprising,

a timer configured to autonomously initiate transmission of said information after expiration of a time duration,

a retransmission means for redundantly transmitting said information a predetermined number of times,

a pseudo-randomization means for randomizing the time interval between redundant transmissions,

a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a carrier generator mechanism configured to generate a carrier on which said information to be transmitted is modulated, and

a wake-up circuit configured to initiate said crystal oscillator and said carrier generator mechanism in

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respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said carrier generator mechanism in a reduced current state between transmissions, said information being transmitted after a predetermined delay with respect to when said crystal oscillator and said carrier generator mechanism are placed in said respective active states so as to allow for stabilization in said carrier generator mechanism and said crystal oscillator prior to information transmission;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

a receiver configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receiver configured to establish chip code lock and fine chip code synchronization using said preamble; and

a monitoring means for monitoring said information as received and validated by said receiver.

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~~27~~. A remote power meter monitoring system, comprising:

a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread

spectrum signal at plural frequencies, said information comprising a first field comprising a preamble configured to establish chip code timing synchronization and a second field comprising data, said first field being transmitted prior to said second field, said preamble having a length measured in bit times that is less than n bit times, where n equals a number of chips in a chip code sequence, each radio frequency transmit-only device comprising,

a timer configured to autonomously initiate transmission of said information after expiration of a time duration,

a retransmission means for redundantly transmitting said information a predetermined number of times,

a pseudo-randomization means for randomizing the time interval between redundant transmissions,

a processor configured to generate said information to be transmitted,

a crystal oscillator configured to generate spread spectrum timing for said information generated by said processor,

a carrier generator mechanism configured to generate a carrier on which said information to be transmitted is modulated, and

a wake-up circuit configured to initiate said crystal oscillator and said carrier generator mechanism in respective active states upon expiration of said time duration so as to transmit said information, and configured to place said crystal oscillator and said carrier generator mechanism in a reduced current state between transmissions, said information

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being transmitted after a predetermined delay with respect to when said crystal oscillator and said carrier generator mechanism are placed in said respective active states so as to allow for stabilization in said carrier generator mechanism and said crystal oscillator prior to information transmission;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

a receiver configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receiver comprising respective parallel correlation means for establishing chip code synchronization using said preamble; and

a monitoring means for monitoring said information as received and validated by said receiver.

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~~28~~. The system according to Claims ¹~~65~~, ²~~66~~, ³~~67~~, ⁴~~68~~, ⁵~~69~~, ⁶~~70~~, ⁹~~71~~, ¹⁰~~72~~, ¹¹~~73~~, ¹²~~74~~, or ¹³~~75~~, wherein said radio frequency transmit-only device comprises an information priority mechanism that is configured to increase a rate of information transmission when said sensor data input to said radio frequency transmit-only device changes.

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~~78~~. The system according to Claims ¹~~65~~, ²~~66~~, ³~~67~~, ⁴~~68~~, ⁵~~69~~, ⁶~~70~~,
⁹~~73~~, ¹⁰~~74~~, ¹¹~~75~~, ¹²~~76~~, or ¹³~~77~~, wherein said radio frequency transmit-only device further comprises:

a transmitter oscillator having an enable input being configured to generate a carrier on which said information is carried;

a power amplifier having an enable input and being configured to amplify said carrier prior to transmission of said information which modulates said carrier; and

an enabling device connected to said enable input of said transmitter oscillator and said enable input of said power amplifier configured to enable an active state of said transmitter oscillator and said power amplifier during periods of information transmission and configured to place said transmitter oscillator and said power amplifier in a low current state during periods of non-transmission, thereby reducing current drain.

80. The system according to Claims 65, 66, 67, 68, 69, 70, 73, 74, 75, 76, or 77, wherein said radio frequency transmit-only device further comprises:

a processor configured to generate said information to be transmitted; and

a wake-up circuit that maintains said processor in a reduced current state between transmissions, and upon expiration of said time duration, as determined by said timer, places said processor in a normal operational state.

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~~81~~. The system according to Claims ~~65~~, ~~66~~, ~~70~~, ~~73~~, or ~~74~~,
wherein said radio frequency transmit-only device comprises a
programming connector means for assigning said identification
address to said radio frequency transmit-only device using a
serial data stream.

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~~82~~. The system according to Claim ~~81~~,¹⁷ further comprising a
hand held terminal configured to load said identification address
in the serial data stream to said programming connector.

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~~83~~. The system according to Claims ~~65~~, ~~66~~, ~~70~~, ~~73~~, or ~~74~~,
wherein said timer is configured to divide said time duration into
a very fine number of temporal time slots.

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~~84~~. The system according to Claims ~~65~~, ~~70~~, ~~73~~, or ~~74~~,
wherein said radio frequency transmit-only device includes a
programming connector means for assigning through a serial data
stream said identification address, a type code, and a code
division multiple access channel on which said radio frequency
transmit-only device is to operate.

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~~85~~. The system according to Claims ~~66~~, ~~67~~, ~~70~~, ~~74~~, or ~~75~~,
wherein said radio frequency transmit-only device comprises a data
rate between 14 Kb/s and 21 Kb/s and a chip rate between ^{1 MHz}~~1.0 Mc/s~~
and 1.3 ^{MHz} Mc/s.

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~~86~~. The system according to Claims ~~65~~, ~~66~~, ~~67~~, ~~68~~, ~~69~~, ~~70~~,

⁹~~73~~, ¹⁰~~74~~, ¹¹~~75~~, ¹²~~76~~, or ¹³~~77~~ wherein said pseudo-randomization means is configured to be seeded with said identification address so as to prevent repeat collisions.

87. A remote power meter monitoring method, comprising the steps of:

retrieving data from a sensing element;

generating information containing the retrieved data, comprising,

generating an identification address field for holding an identification address corresponding to a transmit-only device, and

generating an error correction code;

transmitting the generated information, redundantly at pseudo random intervals from said transmit-only device, comprising,

loading a timer with a pseudo random time interval value,

enabling, upon expiration of said timer, a crystal oscillator used to generate spread spectrum timing signals, a transmitter oscillator used to generate transmission signals,

delaying information transmission for a predetermined time period, relative to said expiration of said time interval, to allow for stabilization of said crystal oscillator and said transmitter oscillator,

transmitting a preamble portion of said information used for spread spectrum timing synchronization, said preamble having a length in bit times at least equal to a number of chips

in a chip code sequence used in direct sequence spread spectrum format by said transmit-only device,

transmitting the generated information in said direct sequence spread spectrum format based upon said chip code sequence and said spread spectrum timing signals at a predetermined frequency by said transmit-only device,

disabling said crystal oscillator and said transmitter oscillator, so as to conserve power;

repeating said step of transmitting said generated information redundantly after a pseudorandom interval of time so as to provide information transmission redundancy;

receiving the generated information by at least one receiver;

validating the received information based on said identification address and said error correction code;

transferring the validated information to a monitoring mechanism; and

monitoring the received data in the validated information with the monitoring mechanism.

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~~26~~ 26. The method of Claim ²⁵~~27~~, wherein said step of generating information, comprises generating said information to have a data rate of approximately 14 Kb/s to 21 Kb/s and a chip rate of approximately 1 ^{MHz to 1.3 MHz}~~Mcs to 1.3 Mc/s~~.

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~~27~~ 27. The method according to Claim ²⁶~~27~~, further comprising the step of programming said identification address into said transmit-only device via a programming connector prior to

installing said transmit-only device.

²⁸~~28~~. The method according to Claims ²⁵~~27~~ or ²⁶~~28~~, wherein said step of transmitting said generated information, redundantly comprises the substep of generating said preamble using a preamble chip code that is a same chip code sequence as that used with said received data.

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²⁹~~29~~. A remote power meter monitoring system, comprising:
a multiplicity of radio frequency transmit-only devices configured to transmit information, each radio frequency transmit-only device comprising,

a timer configured to autonomously initiate transmission of said information after expiration of a time duration,

a random number generator configured to generate ^{apseudo}~~said pseudo~~ random time interval value and to cause the time interval between transmissions to be pseudorandom, and

a retransmission mechanism configured to retransmit said information a predetermined number of times;

at least one sensing element configured to provide sensor data gathered therein to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

at least two receivers configured to receive said transmitted

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a retransmission mechanism configured to cause said information to be retransmitted a predetermined number of times,

and

a wake-up circuit configured to initiate said crystal oscillator and said processor in respective active states upon expiration of said time duration so as to transmit said information when in said respective active states, and configured to place said crystal oscillator and said processor in a reduced current state between transmission times;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising,

a data field that holds said sensor data,

an address field that holds an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and

an error field that holds error detection code bits;

at least two receivers each configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receivers providing redundant reception of said transmitted information; and

a monitoring apparatus that is configured to monitor said information as received and validated by at least one of said receivers.

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25. A remote power meter monitoring system, comprising:
a multiplicity of radio frequency transmit-only devices

information based on said identification address and said error detection code bits contained in said transmitted information, said receivers providing redundant reception of said transmitted information, said receivers configured to establish chip code synchronization to said direct sequence spread spectrum signal using said preamble; and

a monitoring apparatus that is configured to monitor said information as received and validated by at least one of said receivers.

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~~34~~. A remote power meter monitoring system, comprising:

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a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, said information comprising a first field comprising a preamble configured to establish chip code timing synchronization and a second field comprising data, said first field being transmitted prior to said second field, said preamble having a length measured in bit times that is at least equal in length to a number of chips in a chip code sequence plus approximately five bit times, each radio frequency transmit-only device comprising,

a timer comprising a memory that holds a pseudo random time interval value, and configured to autonomously initiate transmission of said information after expiration of a time duration corresponding to said pseudo random time interval value held in said memory,

a random number generator configured to generate

said pseudo random time interval value and load said pseudo random time interval value into said timer, and

a retransmission device for redundantly transmitting said information a predetermined number of times;

at least one sensing element configured to provide sensor data to said radio frequency transmit-only device, said transmitted information comprising said sensor data, an identification address being assigned to said radio frequency transmit-only device to which the sensor data is provided, and error detection code bits;

at least two receivers each configured to receive said transmitted information, and configured to validate said information based on said identification address and said error detection code bits contained in said transmitted information, said receivers providing redundant reception of said transmitted information, said receivers configured to establish chip code lock and fine chip code synchronization using said preamble; and

a monitoring device for monitoring said information as received and validated by at least one of said receivers.

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~~25~~. A remote power meter monitoring system, comprising:

a multiplicity of radio frequency transmit-only devices configured to transmit information in a direct sequence spread spectrum signal at plural frequencies, said information comprising a first field comprising a preamble configured to establish chip code timing synchronization and a second field comprising data, said first field being transmitted prior to said second field,

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